# Weather or Not?

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## NOAA's Newest Weather Satellite Will Improve Weather Forecasting

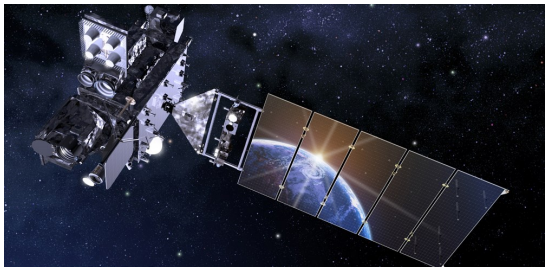
Courtesy of NOAA.gov

GOES-R, the first of NOAA's highly advanced geostationary weather satellites, lifted off from Cape Canaveral, Florida, at 6:42 p.m. EST November 19, 2016. The satellite will boost the nation's weather observation network and NOAA's prediction capabilities, leading to more accurate and timely forecasts, watches and warnings.

GOES-R lifts off from Cape Canaveral, Florida, on November 19, 2016.

Once GOES-R was situated in orbit 22,300 miles above Earth on November 29th, it became known as GOES-16. Sometime in November, 2017, after undergoing a checkout and validation of its six instruments, the new satellite will become operational.

"The next generation of weather satellites is finally here. GOES-R is one of the most sophisticated Earth-observing platforms ever devised," said NOAA Administrator Kathryn Sullivan, Ph.D. "GOES-R's instruments will be capable of scanning the planet five times faster and with four times more resolution than any other satellite in our fleet. With these new instruments and powerful new capabilities, GOES-R will strengthen NOAA's ability to issue life-saving forecasts and warnings and make the United States an even stronger, more resilient Weather-Ready Nation."



GOES-16 will scan the skies five times faster than today's GOES spacecraft, with four times greater image resolution and three times the spectral channels. It will provide high-resolution, rapid-refresh satellite imagery as often as every 30 seconds, allowing for a more detailed look at a storm to determine whether it is growing or de-

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# The 2017 NWS Heat Risk Project

by Mark Moede (NWS San Diego)

Beat the Heat! Learn how: nws.noaa.gov/os/heat/index.shtml

## Purpose of the Heat Risk Project

Did you know that heat is the #1 ranked weather related killer? In the National Weather Service's Western Region, heat kills more people annually than floods, lightning and tornadoes combined. However, unlike these weather phenomena, there were inconsistent criteria for issuing heat-related watches, warnings, or advisories across the West. This inconsistency led to a patchwork of NWS heat-related products and services during past excessive heat events. To address these issues, a multi-tiered framework was created that provides a consistent methodology. It is called the Heat Risk Project.

## How does the Heat Risk Project work?

The Heat Risk Project puts heat in a climatological context. It takes into consideration:

1. How significantly above normal the temperatures are at your location.
2. The time of the year. Is this early-season heat that you likely aren't used to yet? Or is it late-season heat that you have become more used to?
3. The duration of the heat wave.
4. Humidity.

All of these factors are used to create daily heat thresholds which change based on the day of year. NWS temperature forecasts are compared to these heat thresholds at each location and are assigned a color-coded level for each day out to seven days.

These risk level forecasts are *deterministic*, meaning they only reflect the most likely outcome determined by the forecast made at the time. They can and do change at least twice daily. In addition, there is greater uncertainty in the forecast with each succeeding day beyond about three days. It is important to keep an eye on these frequent adjustments and pay particular attention to the issuances of heat watches, warnings and advisories.

The purpose of the NWS experimental Heat Risk Project is to make it easy to understand heat impacts. The Heat Risk is divided into five color-coded categories.

As you can see from the table (below), the higher the value, the greater the heat risk. When Heat Risk values are 1 (yellow), heat is considered to be a concern only for those who are extremely sensitive to heat. A Heat Risk value of 2 (orange) represents a moderate risk for members of heat-sensitive groups. A Heat Risk value of 3 (red) represents a high risk of heat effects for anyone without proper hydration and adequate cooling. A Heat Risk of 4 (magenta) poses a very high risk of heat complications for everyone.

| Category | Level | Meaning |
|---|---|---|
| Green | 0 | No Elevated Risk |
| Yellow | 1 | Low Risk for those extremely sensitive to heat, especially those without effective cooling and/or adequate hydration |
| Orange | 2 | Moderate Risk for those who are sensitive to heat, especially those without effective cooling and/or adequate hydration |
| Red | 3 | High Risk for much of the population, especially those who are heat sensitive and those without effective cooling and/or adequate hydration |
| Magenta | 4 | Very High Risk for entire population due to long duration heat, with little to no relief overnight |

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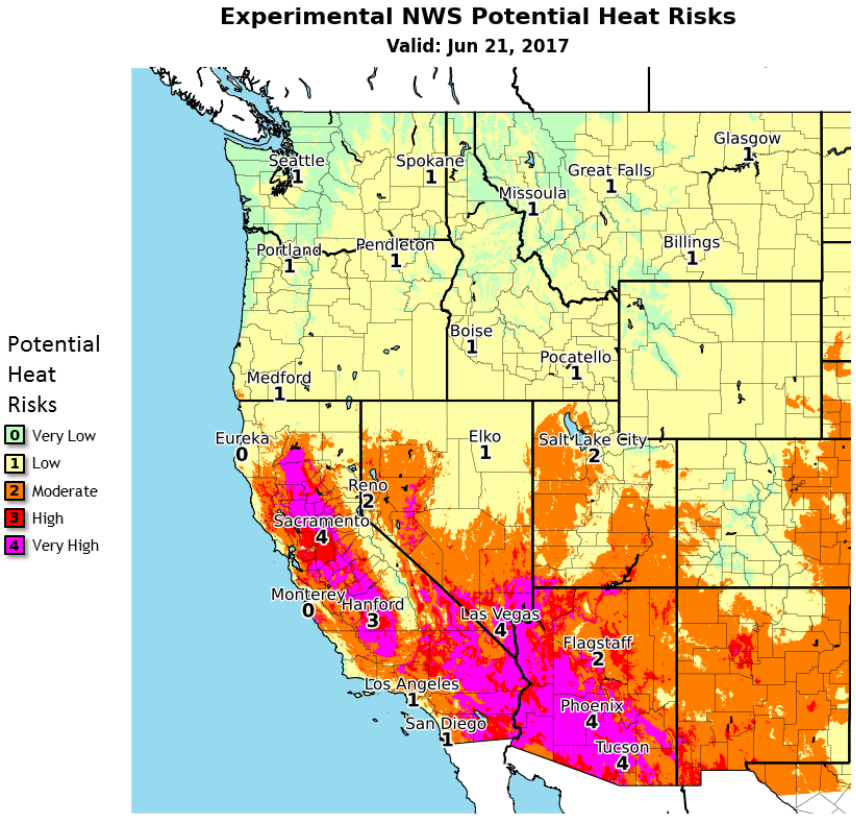
# The 2017 NWS Heat Risk Project

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## Heat Risk Map

A Heat Risk Map for the western U.S. is created using the forecast temperatures and climatological averages. Here is the Heat Risk map (above) from June 21, 2017. This is when we were in the midst of a long heat wave over the Southwestern U.S. Notice how much magenta color covers the deserts. Numerous record temperatures were broken in the deserts during this period. Palm Springs reached a high of 122 degrees three days in June!

The Heat Risk map can be found on our webpage at weather.gov/LosAngeles. Click on the "Forecasts" tab, and select "Experimental Heat Risk" from the dropdown menu.

## Conclusions

Because heat impacts different groups of people in different ways, the level of Heat Risk that is important to you may be different than it is for another person. It also may be different depending on what activities you are engaged in, or what medication you are on. Heat-sensitive people should monitor the Heat Risk forecasts and take action to avoid adverse heat effects when the forecast is calling for an orange risk or greater. For those less heat-sensitive with easy access to air conditioned spaces, red or magenta might be the levels to pay attention to. In this way the Heat Risk allows for decisions to be made based on individual heat tolerance and situation, and for appropriate actions to be taken.

# From Your Spotter Coordinator, Joe Sirard

Hello, Spotters! I hope you all had a nice spring and summer after a wet winter. Southwestern California finally experienced widespread above normal rainfall, the first time in 6 years!

As far as the upcoming winter is concerned, the Climate Prediction Center (CPC) is forecasting a higher probability of (55-60%) of a La Nina over the equatorial Pacific during the fall and winter months. The CPC is also predicting this upcoming winter (Dec-Feb) over southwestern California has a 35-40% chance of above normal temperatures and a 33% chance of above, normal or below normal precipitation. In other words, as far as winter precipitation is concerned, there is great uncertainty in the amount of rainfall and mountain snowfall that can be expected this winter.

No matter how much rain we get, if you have a rain gauge and you receive significant rainfall this winter (e.g. 1.00 inch or more in 24-hours), you may wish to relay that information to NWS Oxnard via e-spotter (see page 17) or calling the spotter hotline and relaying your report. I would also encourage you to join CoCoRaHS (see page 16), an organization geared for anyone who enjoys taking precipitation observations.

In this latest issue of *Weather or Not?,* there are a couple of articles on NOAA's newest geostationary weather satellite, GOES-16. This is the first in the next generation of these weather satellites which will help to improve weather forecasting. Other articles will deal with everything from an atmospheric river event last winter, to the NWS's Heat Risk Project, to a story about massive wildfires in the west in September. I hope you enjoy this edition of *Weather or Not?*. If you have any comments or questions please send along an email at **joe.sirard@noaa.gov**. And, as always, keep your eyes on the sky and keep those spotter reports coming in!

# The Southwest California Atmospheric River Event of February 17, 2017

By Robert Munroe and Jayme Laber (NWS Oxnard)

## What is an Atmospheric River?

The term Atmospheric River is used to describe the transportation of water vapor or moisture from tropical regions to the mid-latitudes, which includes the West Coast of the United States. One well known variety or type of Atmospheric River is the "Pineapple Express" due its tropical origin near the Hawaiian Islands. (More here: https://oceanservice.noaa.gov/facts/pineapple-express.html)

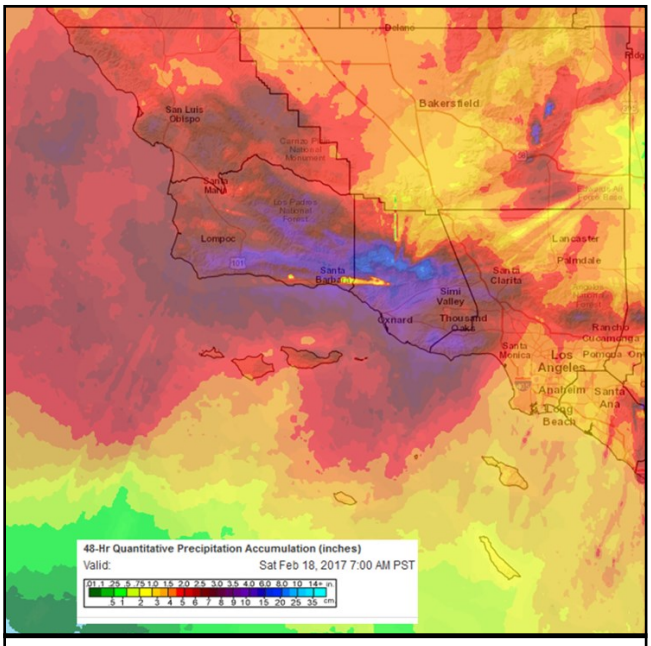
The moisture transport of an Atmospheric River is similar to that of water pumping through a garden hose. Sometimes a trough of low pressure aloft will act as the gardener in this metaphor, but instead of pointing the hose at flowers, the low pressure system points or directs it at the West Coast. When this happens, areas under the influence of the Atmospheric River typically receive significant rain and mountain snowfall. Rain and snow from these events can be beneficial, generally contributing between 30 and 50 percent of annual precipitation along the West Coast. However, significant or long lasting Atmospheric River events can also be devastating, causing flooding, mud and debris flows, and even avalanches. The February 17th Atmospheric River event was both beneficial and devastating to Southwest California. (More here: http://www.noaa.gov/stories/what-are-atmospheric-rivers
and here: https://www.esrl.noaa.gov/psd/atmrivers/)

## The February 17th Atmospheric River Event

The slow moving Atmospheric River event of February 16-18, 2017 produced a widespread area of heavy rainfall across Southwest California, with most of Ventura and Santa Barbara Counties receiving three inches or more of rain, and extensive mountain locations receiving up to 10 inches of rain. Nearly all of the rain fell within a 24 hour period centered on February 17th.

It was widely considered to be the strongest winter storm to impact the area in nearly 6 years. In fact, downtown Santa Barbara received 6.09 inches of rain in a 24 hour period, which according to the NOAA Atlas 14 was as a 1 in 25-year event.

The widespread heavy rain caused local flash flooding, debris flows, and isolated river flooding. The combination of heavy rain and high winds also caused extensive downed trees and power outages. However, it also provided important water resources to the region, providing additional drought improvement.




48-Hour RADAR estimated rainfall totals for February 16-18, 2017

| Santa Barbara County | |
|---|---|
| Montecito Hills | 9.15 |
| Los Prietos | 7.02 |
| Santa Barbara Downtwn | 6.09 |
| | |
| **Ventura County** | |
| Old Man Mountain | 9.89 |
| Upper Matilija Canyon | 9.80 |
| Westlake Village | 6.57 |
| Lake Casitas | 6.05 |
| Oxnard Civic Center | 4.52 |

**Selected 48 hour rainfall totals (Feb 16-18)**

| | 1 hour | Return Pd | Total | Return Pd |
|---|---|---|---|---|
| San Marcos Pass | 1.51 | 5 Year | 10.5 | 25 Year |
| Santa Barbara | | | 5.03 | 10 Year |
| Ventura | 0.6 | 1-2 Year | 4.23 | 5 Year |
| Westlake Village | | | 6.57 | 50 Year |
| Long Beach | 1.05 | 10 Year | 2.77 | 2 Year |

**Selected Peak 1-hr Rainfall Rates, 24-hr Totals, and Associated Climatological Return Periods**

*(Continued on page 5)*

# The Southwest California Atmospheric River Event of February 17, 2017

*(Continued from page 4)*

## The Impacts

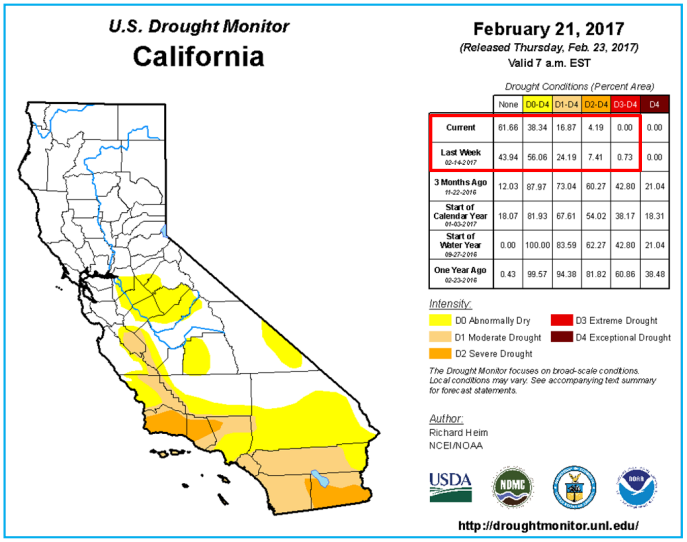
The following impacts were observed as a result of this Atmospheric River event (see below): Roadway Flooding (A), Mud and Debris Flow (B) and Riverine Flooding (C).

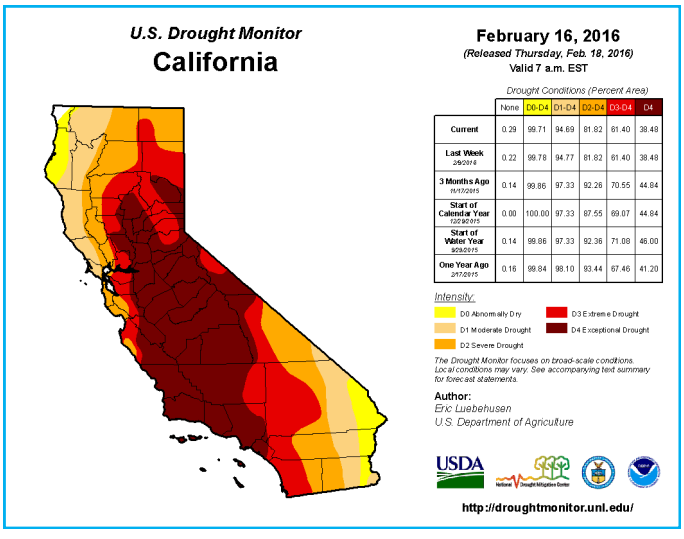



## Drought Relief

The widespread high rainfall totals contributed to continued drought relief across the region (see values in red box below). In fact, some of the highest rainfall amounts fell where rain was needed the most over portions of Santa Barbara and Ventura Counties. Beyond contributing to soil moisture and ground water supply, area reservoirs experienced dramatic increases in water levels.

For comparison, at the bottom is the U.S. Drought Monitor from a year earlier on February 16, 2016.

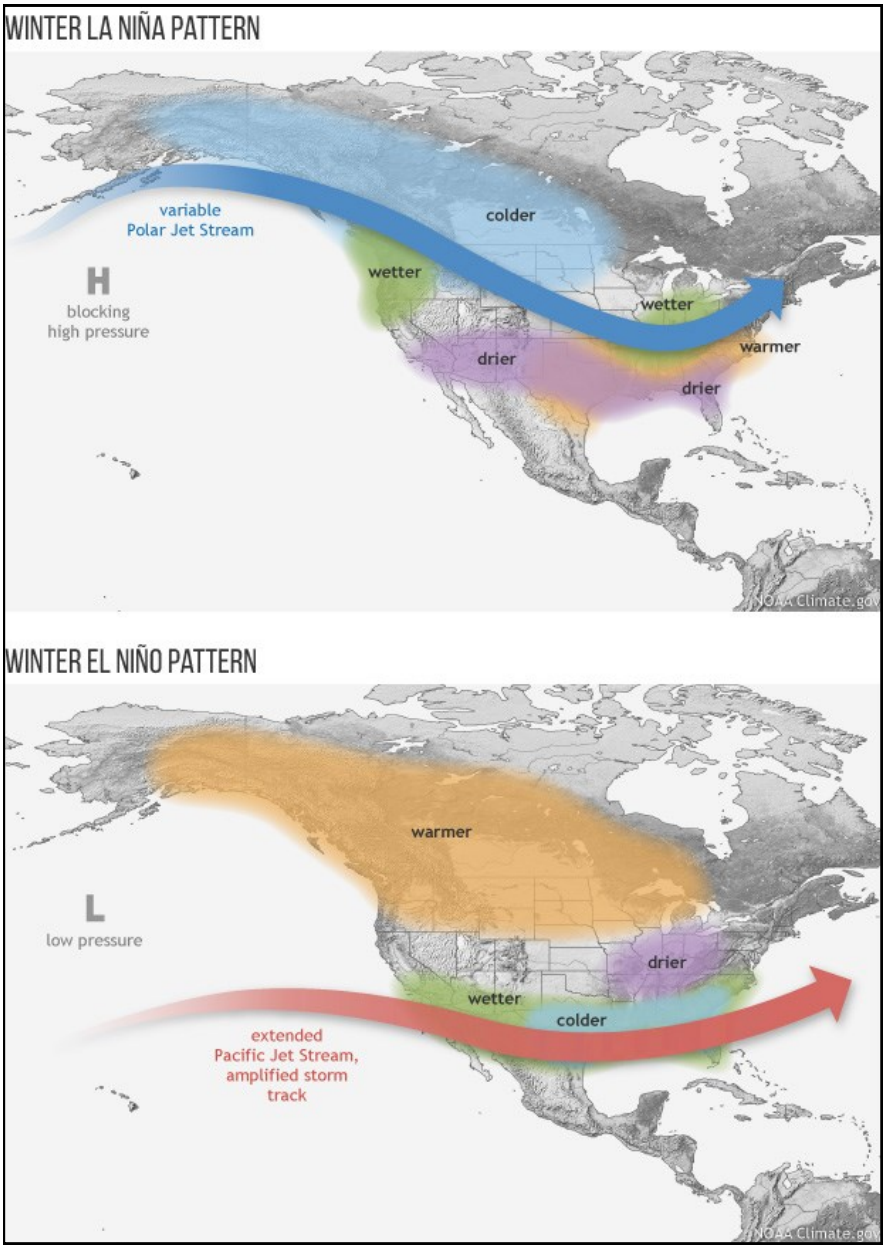


# How El Niño and La Niña affect the winter jet stream and U.S. climate

By Rebecca Lindsey (Climate.gov)

The arrival of El Niño or La Niña in the tropical Pacific Ocean triggers a cascade of changes in tropical rainfall and wind patterns that echo around the globe. For the United States, the most significant impact is a shift in the path of the mid-latitude jet streams. These swift, high-level winds play a major role in separating warm and cool air masses and steering storms from the Pacific across the U.S.




These maps illustrate the typical impacts of El Niño and La Niña on U.S. winter weather. During La Niña, the Pacific jet stream often meanders high into the North Pacific and and is less reliable across the southern tier of the United States. Southern and interior Alaska and the Pacific Northwest tend to be cooler and wetter than average, and the southern tier of U.S. states—from California to the Carolinas—tends to be warmer and drier than average. Farther north, the Ohio and Upper Mississippi River Valleys may be wetter than usual. During El Niño, these deviations from the average are approximately (but not exactly) reversed.

One or more of these climate patterns have occurred during many El Niño and La Niña events in the past. That doesn't mean that **all** of these impacts happen during **every** episode. Every event is somewhat different. In other words, the influence of El Niño on U.S. winter climate is a matter of *probability*, not certainty.

El Niño and La Niña are opposite phases of a natural climate pattern across the tropical Pacific Ocean that swings back and forth every 3-7 years on average. El Niño and La Niña alternately warm and cool large areas of the tropical Pacific—the world's largest ocean—which significantly influences where and how much it rains there.

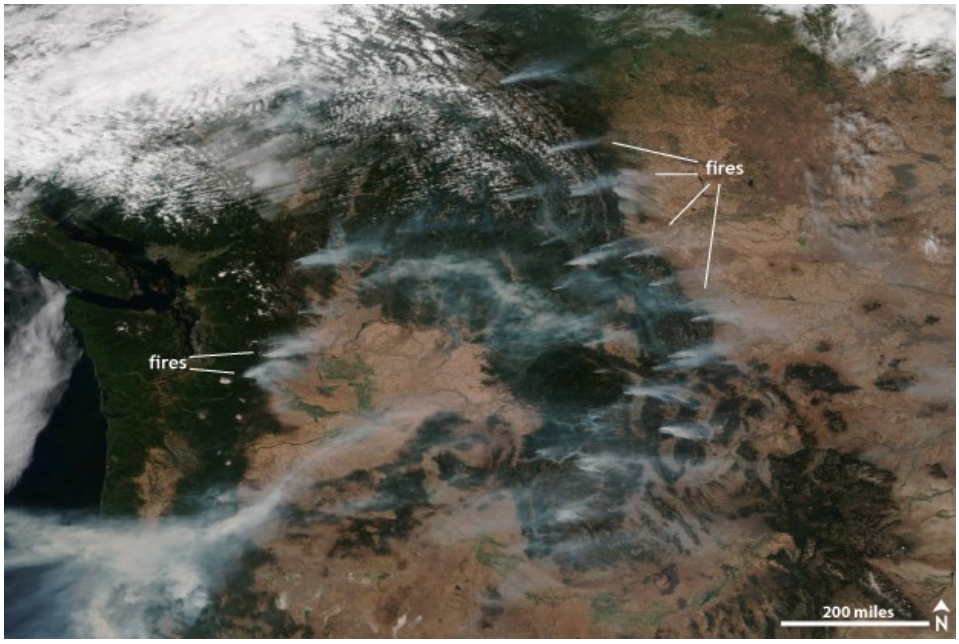
Like a boulder dropped into a stream, this shift in the location of tropical rainfall disrupts the atmospheric circulation patterns that connect the tropics with the middle latitudes, which in turn modifies the mid-latitude jet streams. By modifying the jet streams, El Niño and La Niña can affect temperature and precipitation across the United States and other parts of the world. The influence on the U.S. is strongest during the winter (December-February), but it may linger into early spring.

# Massive fires burning across the West in September 2017

By Tom Di Liberto (Climate.gov)

In early September 2017, while Texans were assessing the damage wrought by Hurricane Harvey, and the Southeast was eyeing Major Hurricane Irma, the western half of the country was suffering through record-breaking heat and skies filled with smoke from numerous wildfires burning all across the West.

In this satellite image taken on September 2 (right), numerous wildfires can be seen dotting the landscape across the Mountain West and along the West Coast. As of September 6, there were 65 ongoing fires across the United States according to the National Interagency Fire Center, all of which were located in the western United States and sending smoke into the air, reducing visibilities and blocking the sun.




Suomi NPP satellite image taken of the western United States on September 2, 2017 sing the VIIRS instrument. The smoke from multiple fires burning across the region is visible. NOAA Climate.gov image using data provided by the NOAA Environmental Visualization Laboratory.


Suomi NPP satellite image taken of the United States on September 4, 2017 using the VIIRS instrument. Thanks to the wind, the smoke from fires burning across the western United States was able to spread across the country. NOAA Climate.gov image using data provided by the NOAA Environmental Visualization Laboratory.

In fact, a fire in the Columbia River Gorge in Oregon had spread smoke across the Pacific Northwest with some cities like Seattle and Portland even dealing with falling ash. The Associated Press reported that the last time locals can remember ash falling from the sky was when Mount St. Helens erupted in 1980.

In Montana, 23 fires were ongoing in early September across the state and had burned at least 400,000 acres. The largest was the Rice Ridge

*(Continued on page 12)*

# U.S. Winter Outlook: NOAA forecasters predict cooler, wetter North and warmer, drier South

Courtesy of noaa.gov

Forecasters at NOAA's Climate Prediction Center released the U.S. Winter Outlook on October 19th, 2017, with La Nina potentially emerging for the second year in a row as the biggest wildcard in how this year's winter will shape up. La Nina has a 55- to 65-percent chance of developing before winter sets in.

NOAA produces seasonal outlooks to help communities prepare for what's likely to come in the next few months and minimize weather's impacts on lives and livelihoods. Empowering people with actionable forecasts and winter weather tips is key to NOAA's effort to build a Weather-Ready Nation.

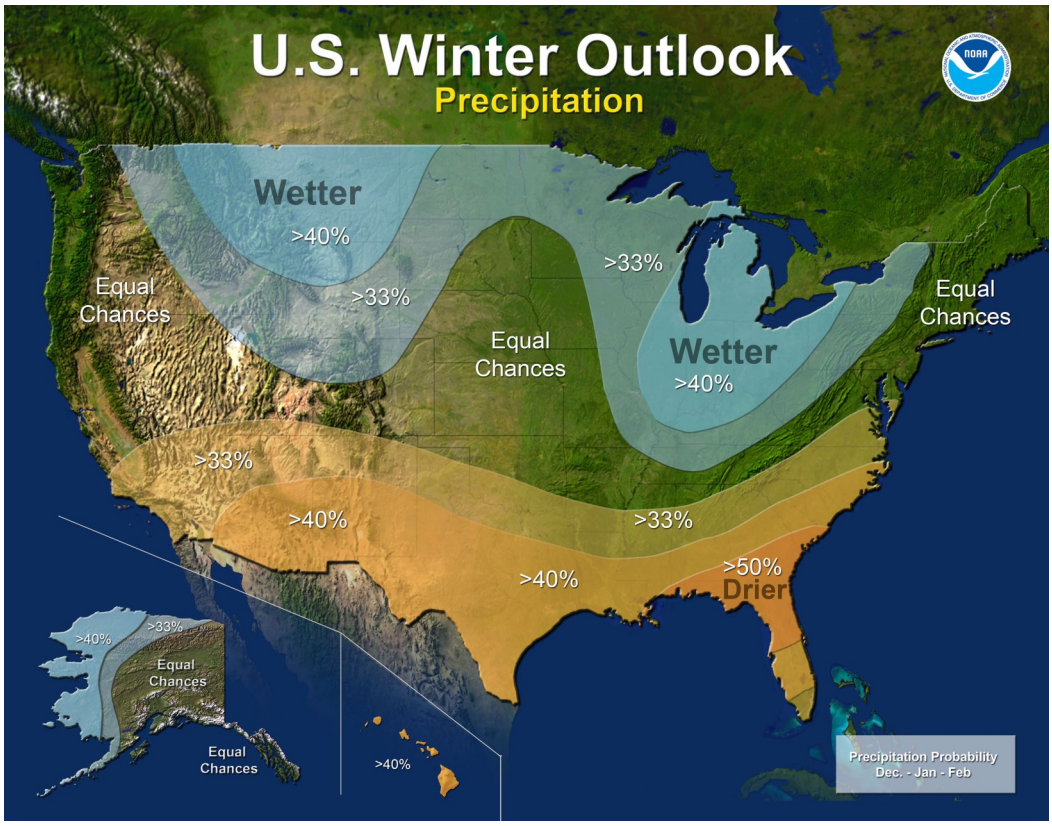
"If La Nina conditions develop, we predict it will be weak and potentially short-lived, but it could still shape the character of the upcoming winter," said Mike Halpert, deputy director of NOAA's Climate Prediction Center. "Typical La Nina patterns during winter include above average precipitation and colder than average temperatures along the Northern Tier of the U.S. and below normal precipitation and drier conditions across the South."

Other factors that influence winter weather include the Arctic Oscillation, which influences the number of arctic air masses that penetrate into the South and is difficult to predict more than one to two weeks in advance, and the Madden-Julian Oscillation, which can affect the number of heavy rain events along the West Coast.

**The 2017 U.S. Winter Outlook (December through February):**

**Precipitation**

- Wetter-than-average conditions are favored across most of the northern United States, extending from the northern Rockies, to the eastern Great Lakes, the Ohio Valley, in Hawaii and in western and northern Alaska.

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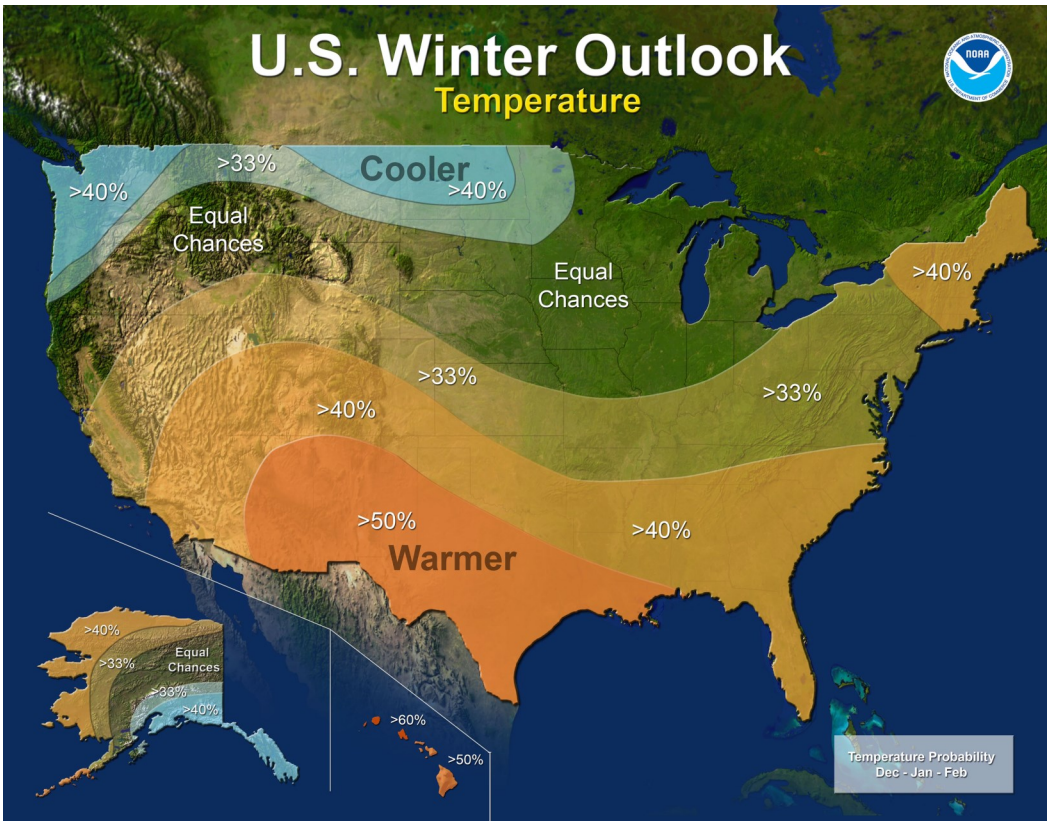
# U.S. Winter Outlook: NOAA forecasters predict cooler, wetter North and warmer, drier South

*(Continued from page 8)*

- Drier-than-normal conditions are most likely across the entire southern U.S.

**Temperature**

- Warmer-than-normal conditions are most likely across the southern two-thirds of the continental U.S., along the East Coast, across Hawaii and in western and northern Alaska.




- Below-average temperatures are favored along the Northern Tier of the country from Minnesota to the Pacific Northwest and in southeastern Alaska.

- The rest of the country falls into the equal chance category, which means they have an equal chance for above-, near-, or below-normal temperatures and/or precipitation because there is not a strong enough climate signal in these areas to shift the odds.

**Drought**

- Despite the outlook favoring above-average precipitation this winter, drought is likely to persist in parts of the northern Plains, although improvement is anticipated farther West.

- Elsewhere, drought could develop across scattered areas of the South, mainly in regions that missed the rainfall associated with the active 2017 hurricane season.

NOAA's seasonal outlooks give the likelihood that temperature and precipitation will be above-, near, or below-average, and also how drought is expected to change, but do not project seasonal snowfall accumulations. While the last two winters featured above-average temperatures over much of the nation, significant snowstorms still impacted different parts of the country. Snow forecasts are generally not predictable more than a week in advance because they depend upon the strength and track of winter storms. The U.S. Winter Outlook will be updated on November 16.

# A whirlwind of an Atlantic hurricane season: What gives?

Courtesy of NOAA.gov

This year's busy Atlantic hurricane season with back-to-back strong storms and multiple landfalls has everyone asking: Why is this happening? Well, the season is playing out as NOAA predicted in May and August. Let's dive into the science behind this year's hurricane season with NOAA's lead hurricane season forecaster, Dr. Gerry Bell.

**Q: How does the season so far compare with your predictions?**

A: We've had 15 named storms, of which 10 were hurricanes, including 5 major hurricanes. Our August prediction increased the initial May outlook to 14-19 named storms, 5-9 hurricanes, and 2-5 major hurricanes after it became clear that El Nino wouldn't form and weaken the season.

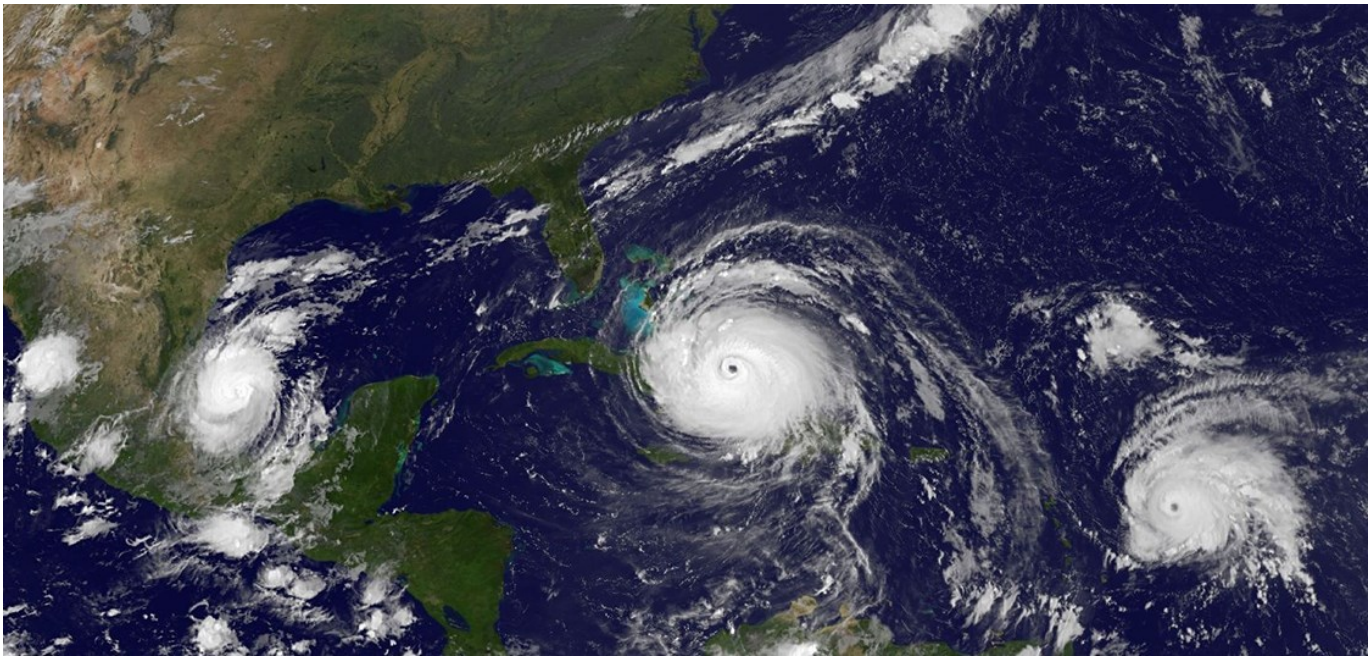
**Q: Is this a typical hurricane season?**

A: We've had 14 extremely active seasons since 1950, and this is the first since 2010. An average season produces 12 named storms, of which six become hurricanes, including three major hurricanes.

**Q: What climate patterns stoke and fuel hurricanes?**

A: Three main climate patterns influence hurricane development:

- The Atlantic Multi-Decadal Oscillation, or AMO, is a climate pattern over the Atlantic Ocean that lasts for decades at a time. When the AMO is in the warm phase, like it has been since 1995, we are predisposed for more active seasons.



GOES-16 full disk image of hurricanes Katia (left), Irma (center), and Jose (right) captured on September 8, 2017. (NOAA)

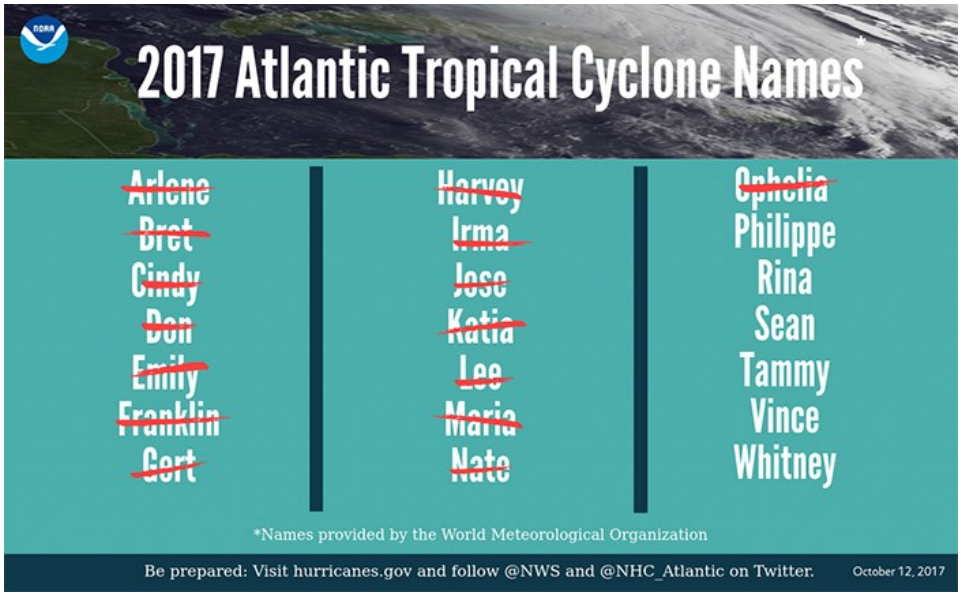
- El Nino and La Nina are season-to-season climate patterns marked by sea surface temperature fluctuations in the tropical Pacific Ocean. El Nino tends to suppress Atlantic hurricanes while La Nina fuels them.

- And finally, the Madden-Julian Oscillation, or the MJO, is a rainfall pattern that propagates around the world. This pattern lasts 30-60 days and produces within-season variability in hurricane activity.

**Q: What conditions are present this year to promote**

*(Continued on page 11)*

# A whirlwind of an Atlantic hurricane season: What gives?

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**such a strong hurricane season?**

A: The AMO is causing a set of interrelated conditions that work together to help hurricanes develop, grow and persist. These conditions are typical of other extremely active seasons that we have seen in the past.

- The Atlantic Ocean is 1-2 degrees F above average;
- The West African monsoon is stronger, which allows wind patterns coming offAfrica to more easily spin up storms;
- An extensive area of weak wind shear across the tropical Atlantic Ocean and Caribbean sea, and weaker than average trade winds across tropical Atlantic, areallowing storms to persist and gain strength; and
- More moisture and atmospheric instability in the tropical region where storms form allow them to grow larger and stronger.

**Q: How unusual is it to see such a fast succession of powerful storms in one season, like we saw with Harvey, Irma, Jose, Lee, and Maria?**

A: It's not unprecedented during an extremely active season to see a succession of major storms, with more storms tracking further westward and threatening land.

**Q: What's driving so many storms to make landfall this year?**

A: The same wind patterns that produce strong storms also steer them farther westward. We've also had a strong and persistent ridge of high pressure in the upper atmosphere over the western Atlantic causing extremely weak wind shear, which is why so many major hurricanes lasted for so long.

**Q: What's the influence of climate change on hurricanes?**

A: Scientists are still studying the effects of climate change on hurricanes. We know that a warmer climate is always running in the background, causing the atmosphere to hold more moisture and contributing to higher ocean temperatures. We also know that climate change contributes to more devastating impacts from hurricanes, such as higher storm surge due to sea level rise.

**Q: Any parting words?**

A: We're still in peak of a very active hurricane season. Everything is secondary to people making sure that their hurricane preparations and planning remain in place for the rest of season.

# Massive fires burning across the West in September 2017

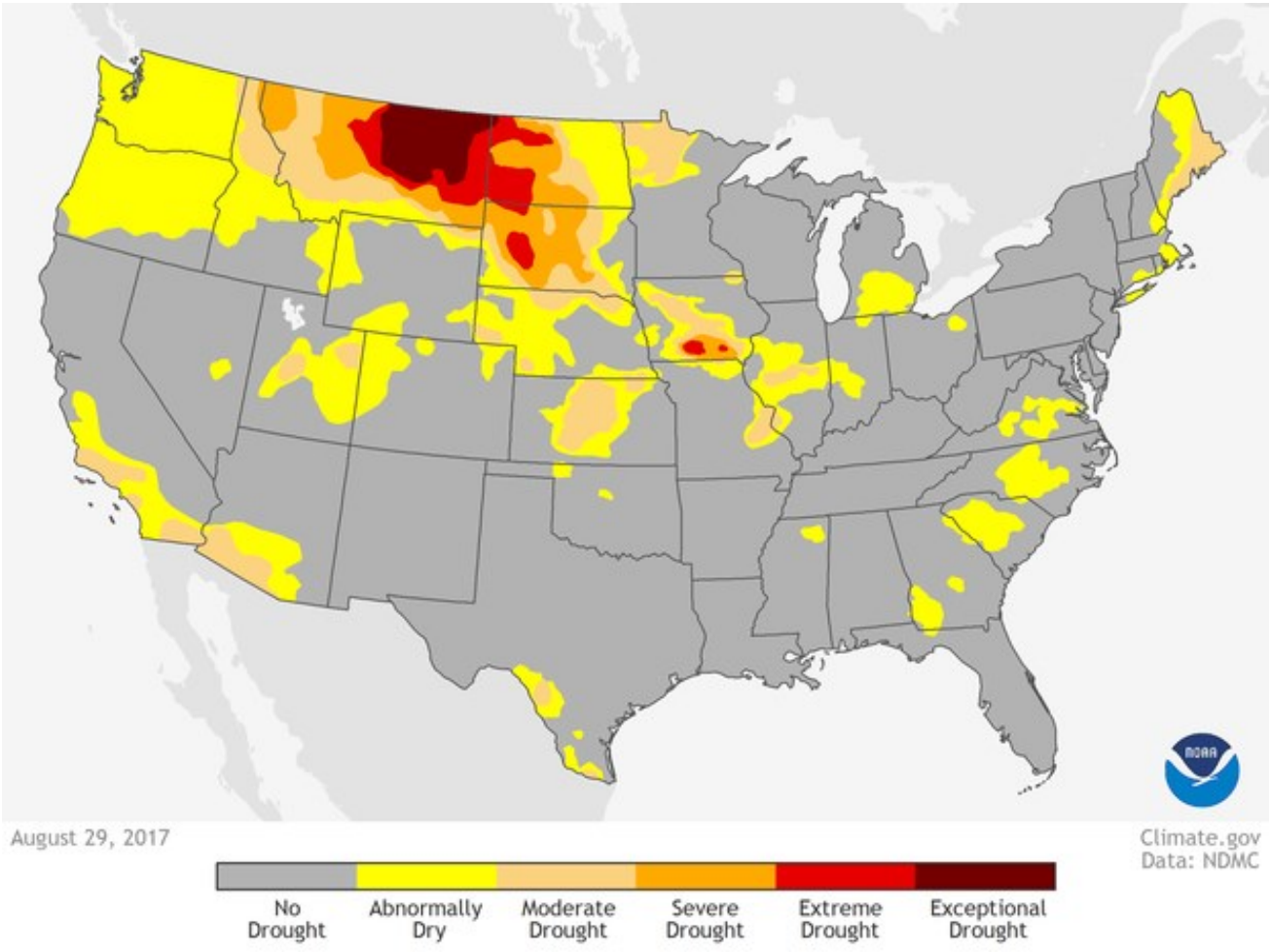
*(Continued from page 7)*

fire which burned over 100,000 acres through September 7th.

Meanwhile, outside of Burbank, California, the La Tuna fire had become the largest on record for a wildfire within the city limits of Los Angeles. It burned through over 7,000 acres and created scenes that look like they were taken during the filming of a disaster movie.

The smoke from these fires didn't just stay put across the west. Instead, it hitched a ride along the jet stream—area of fast moving winds high in the atmosphere—and traveled with the winds across the United States. In the satellite image taken on September 4 (lower left page 7), smoke from western fires is visible being extended across the country, becoming intertwined with clouds as it gets stretched like a piece of saltwater taffy.

A dry, hot summer across the western United States was the reason for a fire-filled start to September. Aided by a large high pressure system which reduced clouds and allowed for scorching hot temperatures, the below-average rains and hot temperatures helped provide the fuel for these wildfires. All that was needed was a spark, from either lightning or human-activity. And for many places across the west, a spark was found.

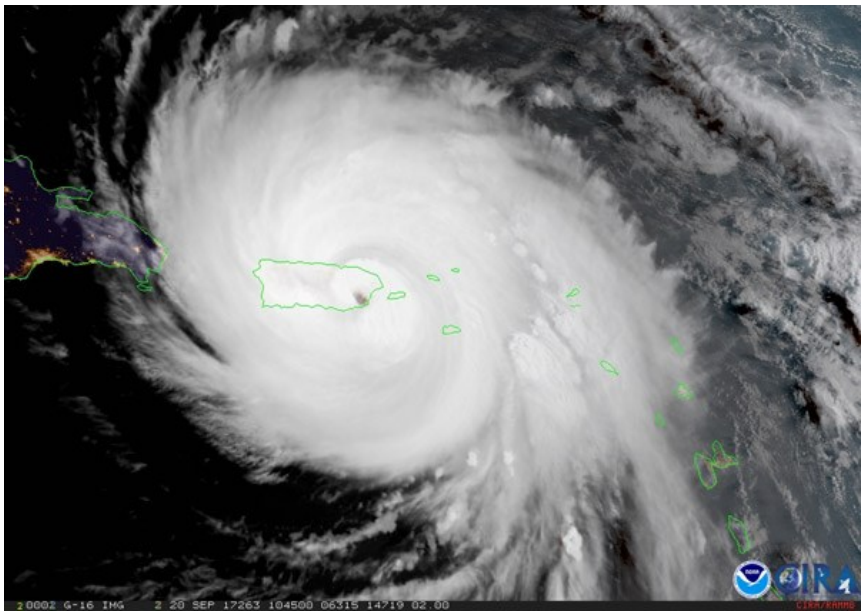



U.S. Drought Monitor on August 29, 2017. The U.S. Drought Monitor highlights areas across the country experiencing either short or long-term abnormal dryness or drought.

# NOAA's GOES-16 Provides Critical Data on Hurricane Maria

Courtesy of www.goes-r.gov

Although not yet operational, data from NOAA's GOES-16 satellite proved vital in forecasting operations for Hurricane Maria as it neared Puerto Rico on September 20, 2017. Radar in San Juan went out at 5:50 a.m. EDT, just before Maria made landfall on the island. Land-based radar is used during storms to provide detailed information on hurricane wind fields, rain intensity, and storm position and movement. With this critical technology disabled and a major hurricane approaching, forecasters were able to utilize data from NOAA's latest geostationary satellite, GOES-16, to track the storm in real-time.

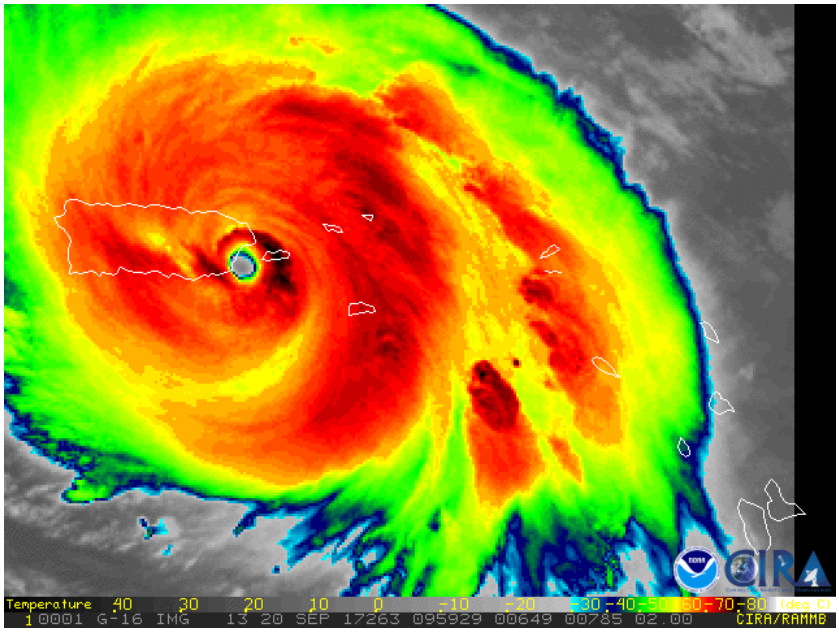


GOES-16 geocolor image of Hurricane Maria over Puerto Rico as it made landfall on September 20, 2017. Credit: CIRA

GOES-16 is able to scan a targeted area of severe weather as often as every 30 seconds, a capability not available with current GOES. This rapid scanning rate is allowing forecasters to analyze cloud patterns and track Maria in real time. GOES-16 also has three times more channels than the current GOES imager, providing better estimates of the structure of tropical cyclones and their environments. The four-fold improvement in resolution from GOES-16 provides greater accuracy of feature attributes, allowing for better characterization of the eyes of hurricanes.

In the absence of radar, GOES-16 data helped fill the void and allowed forecasters to keep an eye on Maria, which made landfall on September 20 near Yabucoa, Puerto Rico, around 6:15 a.m. EDT as a category 4 hurricane. Forecasters continue to use the new capabilities available from GOES-16 to track the storm.

GOES-16, launched in November 2016, is currently in a central checkout orbit of 89.5 degrees west longitude, where it is undergoing an extended validation phase. The satellite will be relocated to its operational location as GOES-East at 75.2 degrees west late this year.




GOES-16 captured this infrared imagery of Hurricane Maria over Puerto Rico on September 20, 2017. The dark red color, like that near the eyewall of the storm, corresponds to areas of great intensity. Credit: CIRA.

# NOAA's Newest Weather Satellite Will Improve Weather Forecasting

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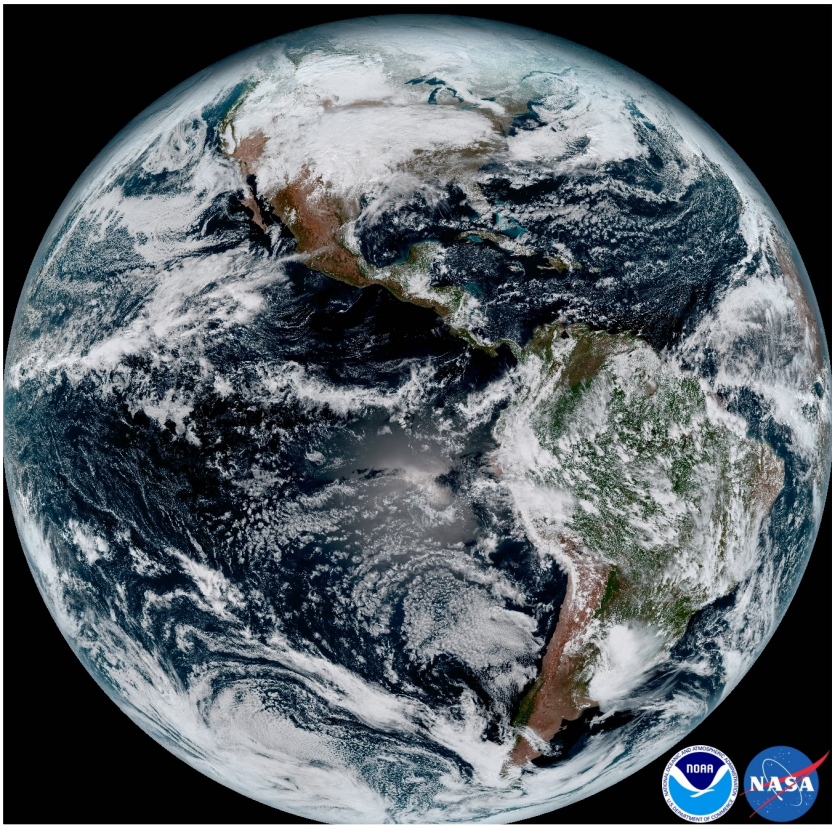
caying.

GOES-R data will help improve hurricane tracking and intensity forecasts, the prediction and warnings of severe weather, including tornadoes and thunderstorms. Additionally, GOES-16's improved rainfall estimates will lead to more timely and accurate flood warnings.




This composite color full-disk visible image was captured at 1:07pm EST on January 15, 2017 and created using several of the 16 spectral channels available on the ABI. The image shows North and South America and the surrounding oceans. GOES-16 observes Earth from from the coast of West Africa, to Hawaii, and everything in between.

"We are ready to receive and process GOES-R (16) data into our forecasts as soon as it is available," said NOAA National Weather Service Director Louis W. Uccellini, Ph.D. "Forecasters will not only have sharper, more detailed views of evolving weather systems, they will have more data – better data – ingested into our weather models to help us predict the weather tomorrow, this weekend and next week. This is a major advancement for weather forecasting."

For the aviation sector, GOES-16 will deliver clearer views of clouds at different atmospheric levels, generating better estimates of wind speed and direction and improved detection of fog, ice and lightning. This will improve aviation forecasts and flight route planning to avoid hazardous conditions such as turbulence.

"GOES-R (16) will significantly improve the ability of emergency managers across America to prepare for, and respond to, weather-related disasters. Better situational awareness will result in better outcomes -- from where to best position resources ahead of a storm to delivering more targeted information to local officials to decide if an evacuation is necessary," said Craig Fugate, FEMA administrator.

GOES-16 is flying six new instruments, including the first operational lightning mapper in geostationary orbit. This new technology will enable scientists to observe lightning, an important indicator of where and when a storm is likely to intensify. Forecasters will use the mapper to hone in on storms that represent the biggest threat. Improved space weather sensors on GOES-16 will monitor the sun and relay crucial information to forecasters so they can issue space weather alerts and warnings. Data from GOES-16 will result in 34 new, or improved, meteorological, solar and space weather products.

"We've crossed an historic performance threshold with GOES-R (16)," said Stephen Volz, Ph.D., director, NOAA's Satellite and Information Service. "NOAA is now operating the most sophisticated technology ever flown in space to help forecast weather on Earth."

There are four satellites in the new GOES series:

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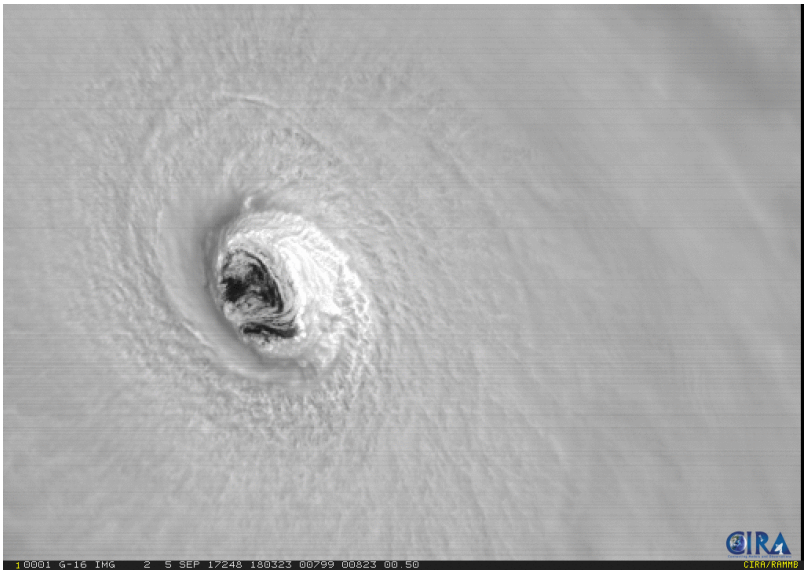
# NOAA's Newest Weather Satellite Will Improve Weather Forecasting




High resolution GOES-16 visible image of Hurricane Irma's eye – 09/05/2017

*(Continued from page 14)*

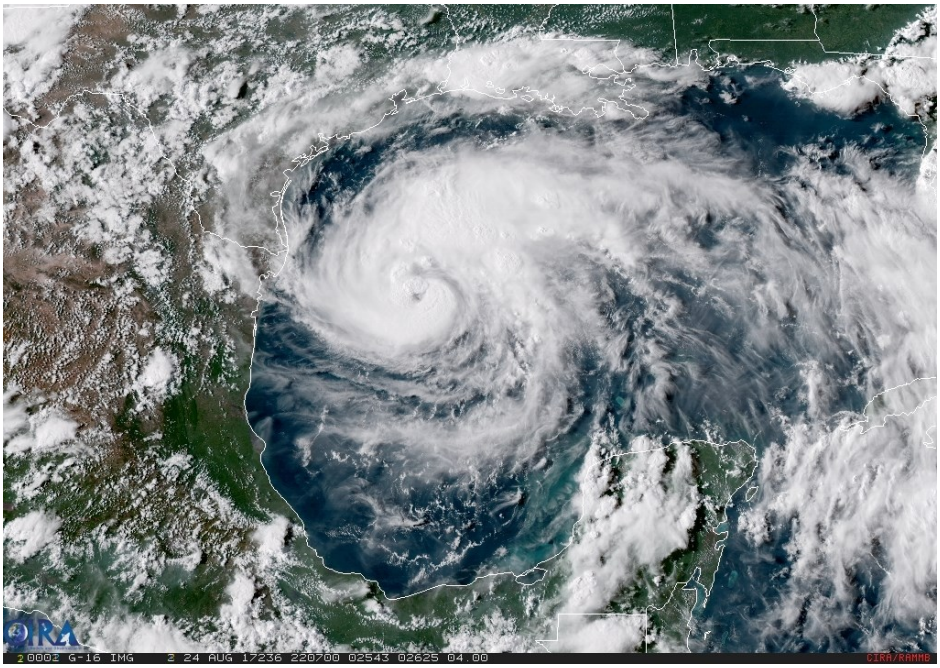
starting with GOES-R (16), followed by GOES–S, –T and –U, which will extend NOAA's geostationary coverage through 2036.

"NOAA and NASA have partnered for decades on successful environmental satellite missions," said Sandra Smalley, director of NASA's Joint Agency Satellite Division, which worked with NOAA to manage the development and launch of GOES-R (16). "Today's launch continues that partnership and provides the basis for future collaboration in developing advanced weather satellites."

Beyond weather forecasting, GOES-16 will be part of SARSAT, an international satellite-based search and rescue network. The satellite is carrying a special transponder that can detect distress signals from emergency beacons.

NOAA manages the GOES-R Series Program through an integrated NOAA-NASA office. NASA's Goddard Space Flight Center oversees the acquisition of the GOES-R series spacecraft and instruments. Lockheed Martin is responsible for the design, creation and testing of the satellites and for spacecraft processing along with developing the Geostationary Lightning Mapper and Solar Ultraviolet Imager instruments. Harris Corp. provided GOES-16's main instrument payload, the Advanced Baseline Imager, the antenna system for data receipt and the ground segment. The Laboratory for Atmospheric and Space Physics provided the Extreme Ultraviolet and X-Ray Irradiance Sensor, and Assurance Technology Corporation provided the Space Environment In-Situ Suite.

Additional GOES-16 satellite information is available at https://www.nesdis.noaa.gov/GOES-16.




Hurricane Harvey in the Gulf of Mexico. GOES-16 Geocolor image taken at 2207Z (3:07 PM PDT) on 8/24/2017.

# CoCoRaHS FAQ

From cocorahs.org

## What is CoCoRaHS??

CoCoRaHS is an acronym for the Community Collaborative Rain, Hail and Snow Network. CoCoRaHS is a unique, non-profit, community-based network of volunteers of all ages and backgrounds working together to measure and map precipitation (rain, hail and snow). By using low-cost measurement tools, stressing training and education, and utilizing an interactive Web-site, our aim is to provide the highest quality data for natural resource, education and research applications. We are now in all fifty states.

## Where did the CoCoRaHS Network originate??

The network originated with the Colorado Climate Center at Colorado State University in 1998 thanks in part to the Fort Collins flood a year prior. In the years since, CoCoRaHS now includes thousands of volunteers nationwide.

## Who can participate??

This is a community project. Everyone can help, young, old, and in-between. The only requirements are an enthusiasm for watching and reporting weather conditions and a desire to learn more about how weather can effect and impact our lives.

## What will our volunteer observers be doing??

Each time a rain, hail or snow storm crosses your area, volunteers take measurements of precipitation from as many locations as possible (see equipment). These precipitation reports are then recorded on our Web site www.cocorahs.org. The data are then displayed and organized for many of our end users to analyze and apply to daily situations ranging from water resource analysis and severe storm warnings to neighbors comparing how much rain fell in their backyards.

## Who uses CoCoRaHS??

CoCoRaHS is used by a wide variety of organizations and individuals. The National Weather Service, other meteorologists, hydrologists, emergency managers, city utilities (water supply, water conservation, storm water), insurance adjusters, USDA, engineers, mosquito control, ranchers and farmers, outdoor & recreation interests, teachers, students, and neighbors in the community are just some examples of those who visit our Web site and use our data.

## What do we hope to accomplish??

CoCoRaHS has several goals: 1) provide accurate high-quality precipitation data for our many end users on a timely basis; 2) increasing the density of precipitation data available throughout the country by encouraging volunteer weather observing; 3) encouraging citizens to have fun participating in meteorological science and heightening their awareness about weather; 4) providing enrichment activities in water and weather resources for teachers, educators and the community at large to name a few.

## Who is sponsoring this network??

The National Oceanic and Atmospheric Administration (NOAA) and the National Science Foundation (NSF) are major sponsors of CoCoRaHS. Other organizations have contributed either financially, and/or with supplies and equipment. Our list of sponsors continues to grow. Many other organizations and individuals have pitched in time and resources to help keep the network up and running. We are grateful to all of you, as CoCoRaHS would not be possible without your help.

## What benefits are there in volunteering??

One of the neat things about participating in this network is coming away with the feeling that you have made an important contribution that helps others. By providing your daily observation, you help to fill in a piece of the weather puzzle that affects many across your area in one way or another. You also will have the chance to make some new friends as you do something important and learn some new things along the way. In some areas, activities are organized for network participants including training sessions, field trips, special speakers, picnics, pot-luck dinners, and photography contests just to name a few.

## How can I sign up??

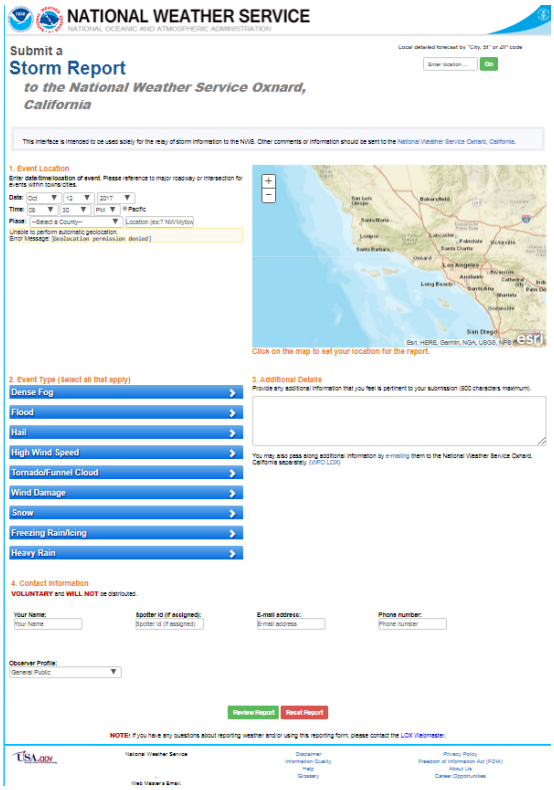
Go to http://cocorahs.org/Application.aspx to sign up as a CoCoRaHS Volunteer Observer or download a pdf version of the application (http://cocorahs.org/Media/docs/CoCoRaHSVolunteerApplication.pdf ) and return it to the address on the form.

# E-Spotter - Online Spotter Reporting

By Joe Sirard

You can submit your spotter report using E-Spotter.

To submit an online spotter report, go to www.weather.gov/losangeles, mouse over 'Local Programs" then go down to "SkyWarn Weather Spotter Program" and click on this link.

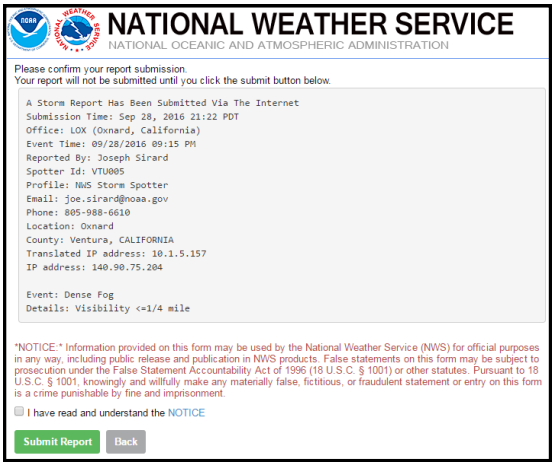

Next, click on **Submit a report.**

This will take you to the web page where you actually enter the event data. Fill in all the pertinent information and use drop down menus to report the event type.

In the Additional Details section, add any detailed information about the event that could be useful. For example, if there has been a heavy rain event and you wish to report 24-hour rainfall or storm total rainfall, you can put the total in this space along with the duration of the rain report. You can also use this section to report any weather-related damage, injuries or fatalities that you are aware of. If you are not sure if you should add additional details, do it anyway as more information about an event is always better than less.

For Observer Profile, use the drop down menu and select NWS Storm Spotter. Please be sure to use your Spotter ID in the appropriate box.

When you are satisfied with your data entry, click on Review Report. Once you are ready to submit the report, click on the box "I have read and understand the NOTICE" and click on submit report. Once submitted, we will receive the report within a few minutes.




## *Did you know?*

The first weather satellite was launched by the United States on April 1, 1960 and was named TIROS-1.

TIROS stood for Television Infrared Observation Satellite and was operational for 78 days.

The spacecraft was 42 inches in diameter, 19 inches high and weighed 280 pounds.

**National Weather Service**
**Los Angeles/Oxnard**
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**This Spotter Newsletter is issued as part of the SKYWARN Storm Spotter Program at the Los Angeles/Oxnard National Weather Service Office.**

**If you are interested in becoming a volunteer Storm Spotter, please access the online training materials at**
**http://www.wrh.noaa.gov/lox/spotter/course/**

**After reviewing the training slides you will need to take a short quiz. Following the training you will be an official SKYWARN Storm Spotter!**

**New spotters will receive a packet of information including our Storm Spotter Pocket Guide and a Spotter ID Badge.**

**Thanks for your interest in the Spotter Program!**

# What to Report?

**Remember to please keep calls short with the information given below, as well as specific times and locations of reports, and a reference to the nearest city/town (if possible). There are many spotters who call at the same time. This helps all calls get through in a timely manner.**

**Flooding/Debris Flows:**
- Rainfall Intensity: How much is falling over a specific period?
- Flooding or Debris Flows that are threatening life/property, or are disrupting traffic.
- Describe the flooding:
  - water depth
  - time it began and ended

**Winter Weather:**
- Amount, rate and time of new snow accumulations.
- Elevation of snow level
- Icing of roads or road closures
- Very low temperatures:
  - Coast: 35 degrees or lower
  - Valleys: 30 degrees or lower
  - Deserts: 20 degrees or lower
- Significant wind chill

**Fog:**
- Report visibilities less than or equal to 1/4 mile

**Wind:**
- Report winds of 30 mph or more
- Speed of winds (sustained or gusts)

**Extreme Heat:**
- Report for these temperature thresholds:
  - Coast: 95 degrees or higher
  - Valleys: 105 degrees or higher
  - Deserts: 115 degrees or higher

**Thunderstorms:**
- Estimated location, duration, speed and direction of movement
- Any hail (size, accumulation, etc)
  - 1/4" = pea size
  - 1/2" = marble size
  - 3/4" = penny size
  - 1" = quarter size
  - 1 3/4" = golf ball size
- Wind speeds and gusts
- Rainfall rate and amount
- If lightning strikes any object

**Surf:**
- Report when surf is 7 feet or greater
- Any flooding or damage caused by high tides and/or high surf

**Tornadoes:**
- Funnel clouds, waterspouts or any rotating clouds
- Estimated location, duration, speed and direction or movement

**Damage or Injuries:**
- Please report any confirmed weather-related damage, injuries, or deaths.